N-formyl methionine at their amino terminus and is therefore specialized for presenting peptides derived from bacterial proteins[7]. Unfortunately, this desirable function is not yet on offer to the human consumer.

In contrast the monomorphic class I molecule (FcRn), which works as an Fc receptor to provide the very young with maternal IgG, is shared by humans and mice[8]. Although it is similar in structure to the peptide-presenting class I molecules[9], FcRn does not bind peptides. Nor does it bind to the Fc of immunoglobulin G in a manner analogous to that envisaged for the interaction between T-cell receptors and class I molecules[10]. Clearly there is functional versatility in the class I structure and CD1 may turn out to be different again. That humans lacking the peptide transporter have low HLA-A,B,C levels but normal CD1a expression[11] argues against this molecule needing to bind peptides. Indeed one wonders if self molecules, lipids or otherwise, are ever chewed upon by CD1 molecules and whether the particular interaction of CD1b with mycolic acid uses the 'peptide-binding site', which even for HLA-A,B,C is a generally greasy groove.

Examination of the antigens recognized by T cells is an increasingly sophisticated and chemically orientated business. Immunologists, who just a few years ago were happily watching T cells respond to crude digests of sperm whale myoglobin or transplanted tissues of another species, suddenly found themselves going through a crash course in the synthesis, separation and study of short peptides. Now, just when they are becoming comfortable with high-pressure liquid chromatography, mass spectrometry and protein crystallography, the ghastly message of Beckman *et al.* is that all of this may not be enough. The future might lie with the lipids. To ensure a place on the fast track the most modern immunologist now needs to fret about fat. □

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GAMMA-RAY ASTRONOMY

February's bizarre event

Peter J. T. Leonard

IN the 1960s, military reconnaissance satellites designed to detect the explosions of nuclear weapons discovered what remains perhaps the most baffling phenomenon in all of astrophysics: isolated bursts of gamma-rays, each lasting only seconds, and appearing at the rate of about one per day at a random location on the sky. Early this year, the most remarkable burst yet was detected. As Hurley *et al.* describe on page 652 of this issue[1], the event lasted over an hour and included photons of energies up to 18 GeV, the hardest ever seen in such a burst.

The origin of γ-ray bursts (GRBs) remains a mystery. Thus far, they have been detected only in γ-ray and X-ray regions of the electromagnetic spectrum, and have not been linked to any known object in the Universe (see for example ref. 2). The physics behind GRBs is a challenge to understand, as the spectra are highly non-thermal and the luminosity fluctuates rapidly. It was hoped that BATSE (the Burst and Transient Source Experiment), EGRET (the Energetic Gamma-Ray Experiment Telescope) and COMPTEL (the Compton Telescope) on board the Compton Gamma-Ray Observatory (CGRO) would solve the mystery, but their results have only deepened it. The first important CGRO results, established by BATSE, are that the GRB sources are distributed fairly uniformly on the sky, and their spatial distribution is finite[3]. These results taken together rule out distant sources confined to the Galactic disk and nearby sources in the Galaxy.

The high-energy, long-duration burst observed by CGRO on 17 February 1994 may turn out to be as serious a constraint on the theory as the earlier CGRO discoveries. This event was not very unusual as observed by BATSE, but was quite bizarre as seen by EGRET, which detected several gigaelectronvolt photons, including one with an energy of 18 GeV that arrived 80 minutes after the original burst. Annoyingly, there was an intervening one-hour period when the Earth was between the source and CGRO, and it is not known whether continuous emission of gigaelectronvolt photons occurred during this interval.

Meteorite made with a fizz

IMAGE UNAVAILABLE FOR COPYRIGHT REASONS

M M Grady, Natural History Museum

THESE seemingly innocuous orange grains of carbonate (each 100–200 μm across) may help answer the question of how warm and wet Mars was in its early history. They are not, of course, ordinary terrestrial carbonates. Rather, they were found embedded in a meteorite that was once a piece of the martian crust, and they thus provide a record of fluid–rock interactions on ancient Mars.

On page 655, C. S. Romanek *et al.* report measurements of the oxygen and carbon isotope compositions of the carbonates that place important constraints on their formation conditions. Whereas an earlier reconnaissance study hinted at formation temperatures as high as 700 °C (suggestive of hydrothermal processes at depth — see *Nature* 369, 356; 1994), the new oxygen isotope measurements provide evidence that the carbonates precipitated in a cooler environment (temperatures in the range 0 to 80 °C) from water rich in dissolved CO_2. Moreover, the carbonates are richer in ^{13}C than their terrestrial counterparts, consistent with CO_2 in the martian atmosphere being the source of carbon. In other words, it now appears that warm, fizzy soda water was once percolating through the near-surface crust of Mars.

Karl Ziemelis